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(54) CALL MANAGEMENT PROTOCOL FOR INSUFFICIENT CREDIT

ANRUFVERWALTUNGSPROTOKOLLE FÜR UNGENÜGENDEN KREDIT

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(74) Representative: **McIlroy, Steven David et al**
Murgitroyd & Company
Scotland House
165-169 Scotland Street
Glasgow G5 8PL (GB)

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(73) Proprietor: **Starscriber Corporation**
Scottsdale, AZ 85266 (US)

(72) Inventor: **Kahn, Ari**
2193 Johannesburg (ZA)

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Description

[0001] THIS invention relates to a method and system for operating a telephony service, and in particular to a call management protocol on a telephony network.

[0002] A substantial number of users of modem telephone networks make use of prepayment mechanisms to pay for their calls on a network. For example, users of a conventional fixed-line telephone network who use public telephones will typically use prepayment cards which store a credit value which is reduced according to the cost of calls made. Users of mobile networks who make use of prepaid airtime typically purchase an airtime recharge voucher which has a unique code. The user contacts the network and enters the code, and the balance of the user's prepaid airtime is increased accordingly. As the user makes calls, the balance is reduced accordingly.

[0003] In either case, once the credit value or prepaid airtime is exhausted, the user is prevented from making further use of the network and in particular making telephone calls until a new prepayment card is obtained (or the existing card is replenished with a further credit value) or further prepaid airtime is "loaded" on the network.

[0004] A similar example of related prior art is US 2001/009849.

[0005] With the advent of modem telephone networks and, more recently, cellular networks with enhanced functionality, it is now possible to modify existing network call management protocols to deal with calls from callers having no airtime or insufficient airtime to make a call.

SUMMARY OF THE INVENTION

[0006] According to the invention there is provided a method of operating a telephony service, the method comprising:

monitoring call attempts from callers on the network to identify call attempts originating from callers who have insufficient credit or airtime to make a call to an intended recipient; and

transmitting from the network a call request to a handset of the intended recipient of the call, wherein the call request is transmitted to a handset of the intended recipient so that the recipient's handset (18) notifies the recipient of such a call attempt, without necessarily establishing a conventional call.

[0007] Typically, the caller is a prepaid caller on the network who has insufficient credit or airtime remaining on the prepayment mechanism that is being used to make the call.

[0008] The prepayment mechanism may be a prepaid telephone card or prepaid network airtime, for example.

[0009] Alternatively, the caller may be a subscriber to the network who has insufficient credit with the network

operator to make the call.

[0010] Preferably, the method includes generating a notification to at least the call recipient that the call request is originating from a subscriber who has insufficient credit to make the call.

[0011] Preferably the method includes generating a notification to the caller that they have insufficient credit or airtime to place the call and that a call request has been submitted to the call recipient.

[0012] The call request may be presented to the call recipient as an in-call notification, typically if the call recipient is on-line.

[0013] Alternatively, the call request may be presented to the call recipient as a message such as an SMS message and/or a voicemail message, typically if the call recipient is off-line.

[0014] Further according to the invention there is provided a system for operating a telephony service, the system comprising:

a telephony network with a plurality of users; and

a network node (14) having call screening logic, characterised in that the network node is arranged to:

i) monitor call attempts from users who have insufficient credit to make a call to the intended recipient (18), and

ii) transmit a call request to the intended recipient of the call, wherein the network node is operable to transmit the call request to a handset (18) of the intended recipient so that the recipient's handset notifies the recipient of such a call attempt, without establishing a conventional call.

[0015] The system may include a database containing details of the credit/airtime status of network subscribers, the network being arranged to establish the credit/airtime status of a caller automatically and to generate the call request if the credit/airtime available to the caller is insufficient to make a call.

BRIEF DESCRIPTION OF THE DRAWING

[0016] The single drawing is a simplified diagrammatic illustration of a call management system according to the invention.

DESCRIPTION OF AN EMBODIMENT

[0017] The drawing shows, in a highly simplified schematic form, the architecture of a part of a modem GSM mobile telephone network. The diagram does not purport to be comprehensive but merely illustrative. The network will typically embody intelligent network (IN) functionality,

but this is not essential for implementation of the invention.

[0018] In the illustrated network, a mobile telephone 10 of a caller communicates with a first base station 12 which in turn communicates with a mobile switching center (MSC) 14. The base station 12 comprises a base station controller (BSC) and a base transceiver station (BTS) with associated antenna (not shown). Associated with the mobile switching center 14 is a visited location register (VLR) 16.

[0019] A call recipient has a mobile telephone 18 which communicates with a second base station 20. The base station 20 is connected to a further mobile switching center (MSC) 22 with its own associated visited location register 24. (In some cases, the two base stations could be connected to the same MSC.) The respective mobile switching centers 14 and 22 and the respective visited location registers 16 and 24 are interconnected as shown. The visited location registers are also connected to a home location register (HLR) 26 and to a billing center 28. The MSCs 14 and 22 are also connected to the billing center. The HLR is a central database containing data relating to the account status and predetermined network settings of subscribers. The VLRs are decentralized databases which are updated with data from the HLR relating to a particular subscriber when that subscriber's telephone connects to the MSC in question.

[0020] Connected to the MSC 14 are a service control point (SCP) 30, a service data point (SDP) 32 and a service switching point (SSP) 34.

[0021] The SCP of the MSC 22 servicing the call recipient has terminating screening logic which is invoked when calls are set to route to the call recipient. The SDP is a database associated with the SCP containing data associated with the call recipient and in the context of this invention defining one or more groups of callers and their respective phone numbers.

[0022] The SSP is an optional intelligent network component forming part of a switching subsystem which essentially defines a network layer associated with switching services.

[0023] If the caller using the mobile telephone 10 has exhausted his/her prepaid airtime (or, in the case of a person using prepayment telephone cards, the user has depleted the credit value on the prepayment card) or does not have credit with the network operator, he/she will not be able to make calls normally. At best, emergency calls to certain predetermined numbers may be permitted by mobile networks, or calls to an operator may be permitted on a conventional network. The present invention proposes utilising the enhanced functionality of modern networks to monitor calls made on the network in order to identify call attempts made by callers with no or insufficient credit/airtime.

[0024] In the present example, when the caller utilising the telephone 10 attempts to make a call to the call recipient 18, the mobile switching center (MSC) 14 accesses the visited location register (VLR) 16 (and, if required,

the billing center 28) and establishes that the caller does not have sufficient credit/airtime to make a call. Instead of routing a conventional call setup request via the MSC 22 to the telephone 18 of the call recipient, in the simplest form of the invention, the call request can be presented to the call recipient as a single ring ("ring once and disconnect") when the call recipient is online and available to the network. This is sufficient to generate a missed call message on the mobile telephone 18 of the call recipient, alerting him/her to the fact that the caller wishes to make contact. The call recipient can then return the call at his/her discretion.

[0025] Preferably, if the call recipient's mobile telephone is on-line, a prerecorded in-call message is presented to the call recipient, indicating that a call request from a caller without credit/airtime has been received. In the case of the call recipient using a conventional telephone on a fixed-line network, a distinctive ringing tone can be presented.

[0026] Preferably, if the call recipient's mobile telephone is off-line or out of coverage, the network submits a notification which is stored and forwarded to the mobile telephone when it becomes available. Here the MSC 22 automatically transmits a signal to a short message service center (SMSC) 36, instructing the SMSC to transmit an SMS message to the call recipient in a predetermined format, requesting the call recipient to contact the caller. Preferably, the SMS message contains the caller's telephone number, extracted by caller line identification (CLI) and can take the following format, for example:

084 4432100 Please ring me

[0027] Optionally, the message can include an indication that the caller has no credit or airtime, for example:

084 4432100 Please ring me - no airtime

[0028] Alternatively, or in addition, a prerecorded voicemail message can be deposited in the voice mailbox of the call recipient, with a conventional notification being sent to the call recipient to alert them to the existence of the SMS and/or voicemail messages. The voicemail message could be entirely computer synthesized, including the caller's telephone number, or could include a recording of the caller's name, recorded previously, in a message requesting the call recipient to respond to the caller's message.

[0029] Compared with alternative proposals for transmitting messages to call recipients, a significant feature of the present invention is that it is not necessary for the caller to construct, address and send an SMS message from their own handset, or to prefix the telephone number of the call recipient with a special code in order to send a message to the call recipient. Instead, the network itself establishes that the caller does not have credit/airtime and automatically transmits a call request and/or message to the call recipient, requesting the call recipient to

contact the caller. The very one and same telephone number is dialed and the network now takes the most appropriate and intelligent action.

[0030] It will be appreciated that variations of the above described example are possible. For example, a more personalized service could be provided in which the network actually establishes a call to the call recipient and, on answering of the call by the call recipient, plays a prerecorded announcement requesting the call recipient to call the caller back, for example by pressing a predetermined button on the telephone. In this way, the caller and the call recipient could be connected reverse charged (the called party assuming the cost of the call) without having to re-establish the call routing and call path, since the caller may be kept actively engaged on the call all the while.

[0031] The described method and system have a number of advantages. Firstly, a caller is able to make contact with a selected call recipient even if the caller is out of credit/airtime on the network. This can include an implicit or explicit request for the call recipient to return the call.

[0032] It is envisaged that the described method and system will increase revenue from subscribers making use of the service, as callers such as children who have insufficient prepaid airtime to make a conventional call are able nevertheless to request a parent or family member to call them back, at the parent or family member's expense. Currently, using existing telephone network operating protocols, such a caller would not be able to establish a call to the person in question.

[0033] A further benefit is that the method and system operate by detecting callers with no or insufficient credit/airtime and allowing them to send call requests via the network, but callers with adequate airtime who simply choose to send a message requesting a call recipient to call them back need not be accommodated.

Claims

1. A method of operating a telephony service, the method being **characterised in that** it comprises:

monitoring call attempts from callers on a network to identify call attempts originating from callers who have insufficient credit or airtime to make a call to an intended recipient; and transmitting from the network a call request to a handset of the intended recipient of the call, wherein the call request is transmitted to a handset of the intended recipient so that the recipient's handset (18) notifies the recipient of such a call attempt, without establishing a conventional call.

2. A method according to claim 1 **characterised in that** the caller is identified as a prepaid subscriber to the

network who has insufficient credit or airtime remaining on the prepayment mechanism that is being used to make the call.

3. A method according to claim 2 **characterised in that** the prepayment mechanism is a prepaid telephone card or prepaid network airtime.
4. A method according to claim 1 **characterised in that** the caller is identified as a subscriber to the network who has insufficient credit with the network operator to make the call.
5. A method according to any one of claims 1 to 4 **characterised in that** it includes generating a notification to at least the call recipient that the call request is originating from a subscriber who has insufficient credit or airtime to make the call.
6. A method according to any one of claims 1 to 5 **characterised in that** the method includes generating a notification to the caller that the caller has insufficient credit or airtime to place the call and that a call request has been submitted to the call recipient.
7. A method according to any one of claims 1 to 6 **characterised in that** the call request is presented to the call recipient as an in-call notification.
8. A method according to any one of claims 1 to 6 **characterised in that** the call request is presented to the call recipient as a message such as an SMS message and/or a voicemail message.
9. A method according to claim 7 **characterised in that** the call request is presented to the call recipient as an in-call notification comprising at least the caller's telephone number or name, a request that the call recipient contact the caller, and a word or phrase indicating that the caller has no or insufficient credit or airtime.
10. A method according to claim 8 **characterised in that** the call request is presented to the call recipient as a message comprising at least the caller's telephone number or name, a request that the call recipient contact the caller, and a word or phrase indicating that the caller has no or insufficient credit or airtime.
11. A method according to any one of claims 1 to 6 **characterised in that** the call request is presented to the call recipient as a predetermined number of rings without establishing a call, when the call recipient is online and available to the network, thereby generating a "missed call" notification to the call recipient.
12. A method according to claim 11 **characterised in that** the call request is presented to the call recipient

as a single ring.

13. A system for operating a telephony service, the system comprising:

a network with a plurality of users; and
a network node (14) having call screening logic,
characterised in that the network node is arranged to:

- i) monitor call attempts from users who have insufficient credit or airtime to make a call to an intended recipient (18); and
- ii) transmit a call request to the intended recipient of the call,

wherein the network node is operable to transmit the call request to a handset (18) of the intended recipient so that the recipient's handset notifies the recipient of such a call attempt, without establishing a conventional call.

14. A system according to claim 13, **characterised in that** it includes a database (28) containing details of the credit/airtime status of network subscribers, the network node (14) being arranged to determine the credit/airtime status of a caller automatically and to generate the call request if the credit/airtime available to the caller is insufficient to make a call.

Patentansprüche

1. Ein Verfahren zum Betreiben eines Telefoniedienstes, wobei das Verfahren **dadurch gekennzeichnet ist, dass** es Folgendes beinhaltet:

Überwachen der Anrufversuche von Anrufern in einem Netzwerk, um Anrufversuche zu identifizieren, die von Anrufern stammen, die nicht über ein ausreichendes Guthaben oder eine ausreichende Gesprächszeit verfügen, um einen Anruf bei einem gewünschten Empfänger zu tätigen; und
Übertragen einer Anrufanforderung vom Netzwerk auf einen Handapparat des gewünschten Empfängers des Anrufs, wobei die Anrufanforderung an einen Handapparat des gewünschten Empfängers übertragen wird, so dass der Handapparat (18) des Empfängers den Empfänger über einen solchen Anrufversuch informiert, ohne einen konventionellen Anruf aufzubauen.

2. Verfahren gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Anrufer als Prepaid-Netzwerkteilnehmer identifiziert wird, dessen verbleibendes Guthaben oder verbleibende Gesprächszeit im Prepayment-Mechanismus, der zum Tätigen des Anrufs

verwendet wird, nicht ausreichend ist.

3. Verfahren gemäß Anspruch 2, **dadurch gekennzeichnet, dass** der Prepayment-Mechanismus in einer Prepaid-Telefonkarte oder in Prepaid-Netzwerkgesprächszeit besteht.

4. Verfahren gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Anrufer als Netzwerkteilnehmer identifiziert wird, dessen Guthaben beim Netzwerkbetreiber nicht ausreichend ist, um den Anruf zu tätigen.

5. Verfahren gemäß einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** es das Generieren einer Benachrichtigung an wenigstens den Anrufempfänger, dass die Anrufanforderung von einem Teilnehmer stammt, dessen Guthaben oder Gesprächszeit nicht ausreichend ist, um den Anruf zu tätigen, beinhaltet.

6. Verfahren gemäß einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** das Verfahren das Generieren einer Benachrichtigung an den Anrufer, dass der Anrufer nicht über ein ausreichendes Guthaben oder eine ausreichende Gesprächszeit verfügt, um den Anruf durchzuführen und dass eine Anrufanforderung an den Anrufempfänger übermittelt wurde, beinhaltet.

7. Verfahren gemäß einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Anrufanforderung dem Anrufempfänger als eine Anrufeingangsbenachrichtigung präsentiert wird.

8. Verfahren gemäß einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Anrufanforderung dem Anrufempfänger als eine Nachricht, wie etwa eine SMS-Nachricht und/oder eine Voicemail-Nachricht, präsentiert wird.

9. Verfahren gemäß Anspruch 7, **dadurch gekennzeichnet, dass** die Anrufanforderung dem Anrufempfänger als eine Anrufeingangsbenachrichtigung präsentiert wird, die wenigstens die Telefonnummer oder den Namen des Anrufers, eine Aufforderung an den Anrufempfänger, den Anrufer zu kontaktieren, und ein Wort oder einen Satz zur Information darüber, dass der Anrufer über kein oder nicht ausreichendes Guthaben oder keine oder nicht ausreichende Gesprächszeit verfügt, beinhaltet.

10. Verfahren gemäß Anspruch 8, **dadurch gekennzeichnet, dass** die Anrufanforderung dem Anrufempfänger als eine Nachricht präsentiert wird, die wenigstens die Telefonnummer oder den Namen des Anrufers, eine Aufforderung an den Anrufempfänger, den Anrufer zu kontaktieren, und ein Wort

oder einen Satz zur Information darüber, dass der Anrufer über kein oder nicht ausreichendes Guthaben oder keine oder nicht ausreichende Gesprächszeit verfügt, beinhaltet.

11. Verfahren gemäß einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Anrufanforderung dem Anrufempfänger als eine zuvor bestimmte Anzahl an Rufzeichen präsentiert wird, ohne einen Anruf aufzubauen, wenn der Anrufempfänger online mit dem Netzwerk verbunden und für das Netzwerk verfügbar ist, wodurch eine "Anruf-in-Abwesenheit"-Benachrichtigung an den Anrufempfänger generiert wird.

12. Verfahren gemäß Anspruch 11, **dadurch gekennzeichnet, dass** die Anrufanforderung dem Anrufempfänger als ein einzelnes Rufzeichen präsentiert wird.

13. Ein System zum Betreiben eines Telefoniedienstes, wobei das System Folgendes beinhaltet:

ein Netzwerk mit einer Vielzahl von Benutzern; und
einen Netzknoten (14) mit einer Anrufabschirmungslogik, **dadurch gekennzeichnet, dass** der Netzknoten eingerichtet ist, um

- i) Anrufversuche von Benutzern, die nicht über ein ausreichendes Guthaben oder eine ausreichende Gesprächszeit verfügen, um einen Anruf bei einem gewünschten Empfänger (18) zu tätigen, zu überwachen; und
- ii) eine Anrufanforderung an den gewünschten Empfänger des Anrufs zu übertragen,

wobei der Netzknoten betriebsfähig ist, um die Anrufanforderung an einen Handapparat (18) des gewünschten Empfängers zu übertragen, so dass der Handapparat des Empfängers den Empfänger über einen solchen Anrufversuch benachrichtigt, ohne einen konventionellen Anruf aufzubauen.

14. System gemäß Anspruch 13, **dadurch gekennzeichnet, dass** es eine Datenbank (28) beinhaltet, die Details über den Guthaben-/Gesprächszeitstatus von Netzwerkteilnehmern enthält, wobei der Netzknoten (14) eingerichtet ist, um den Guthaben-/Gesprächszeitstatus eines Anrufers automatisch zu bestimmen und die Anrufanforderung zu generieren, wenn das dem Anrufer verfügbare Guthaben/die dem Anrufer verfügbare Gesprächszeit nicht ausreichend ist, um einen Anruf zu tätigen.

Revendications

1. Un procédé d'exploitation d'un service de téléphonie, le procédé étant **caractérisé en ce qu'il** comprend :

la surveillance des tentatives d'appel faites par des appelants sur un réseau afin d'identifier les tentatives d'appel provenant d'appelants n'ayant pas suffisamment de crédit ou de temps d'antenne pour appeler un destinataire souhaité ; et

la transmission depuis le réseau d'une demande d'appel à un combiné téléphonique du destinataire de l'appel souhaité, la demande d'appel étant transmise à un combiné téléphonique du destinataire souhaité de manière à ce que le combiné téléphonique (18) du destinataire notifie le destinataire d'une telle demande d'appel, sans établir d'appel classique.

2. Un procédé selon la revendication 1 **caractérisé en ce que** l'appelant est identifié comme étant un abonné « prépayé » au réseau à qui il ne reste plus suffisamment de crédit ou de temps d'antenne sur le mécanisme de prépaiement utilisé pour appeler.

3. Un procédé selon la revendication 2 **caractérisé en ce que** le mécanisme de prépaiement est une carte téléphonique prépayée ou du temps d'antenne prépayé sur un réseau.

4. Un procédé selon la revendication 1 **caractérisé en ce que** l'appelant est identifié comme étant un abonné au réseau n'ayant pas suffisamment de crédit auprès de l'opérateur du réseau pour appeler.

5. Un procédé selon une quelconque des revendications 1 à 4 **caractérisé en ce qu'il** inclut le fait de générer une notification à l'intention au moins du destinataire de l'appel avertissant que la demande d'appel provient d'un abonné n'ayant pas suffisamment de crédit ou de temps d'antenne pour appeler.

6. Un procédé selon une quelconque des revendications 1 à 5 **caractérisé en ce que** le procédé inclut le fait de générer une notification à l'intention de l'appelant avertissant que celui-ci n'a pas suffisamment de crédit ou de temps d'antenne pour faire un appel et qu'une demande d'appel a été soumise au destinataire de l'appel.

7. Un procédé selon l'une quelconque des revendications 1 à 6 **caractérisé en ce que** la demande d'appel est présentée au destinataire de l'appel comme une notification d'appel entrant.

8. Un procédé selon l'une quelconque des revendica-

tions 1 à 6 **caractérisé en ce que** la demande d'appel est présentée au destinataire de l'appel comme un message tel qu'un message SMS et/ou un message de messagerie vocale.

9. Un procédé selon la revendication 7 **caractérisé en ce que** la demande d'appel est présentée au destinataire de l'appel comme une notification d'appel entrant comprenant au moins le numéro de téléphone de l'appelant ou son nom, une demande invitant le destinataire de l'appel à prendre contact avec l'appelant, et un mot ou une phrase indiquant que l'appelant n'a pas de crédit ou de temps d'antenne ou n'en a plus suffisamment.

10. Un procédé selon la revendication 8 **caractérisé en ce que** la demande d'appel est présentée au destinataire de l'appel comme un message comprenant au moins le numéro de téléphone de l'appelant ou son nom, une demande invitant le destinataire de l'appel à prendre contact avec l'appelant, et un mot ou une phrase indiquant que l'appelant n'a pas de crédit ou de temps d'antenne ou n'en a plus suffisamment.

11. Un procédé selon une quelconque des revendications 1 à 6 **caractérisé en ce que** la demande d'appel est présentée au destinataire de l'appel comme un nombre prédéterminé de sonneries sans qu'il y ait établissement d'un appel lorsque le destinataire de l'appel est en ligne et disponible sur le réseau, générant de ce fait une notification d'« appel en absence » à l'intention du destinataire de l'appel.

12. Un procédé selon la revendication 11 **caractérisé en ce que** la demande d'appel est présentée au destinataire de l'appel comme une sonnerie unique.

13. Un système pour l'exploitation d'un service de téléphonie, le système comprenant :

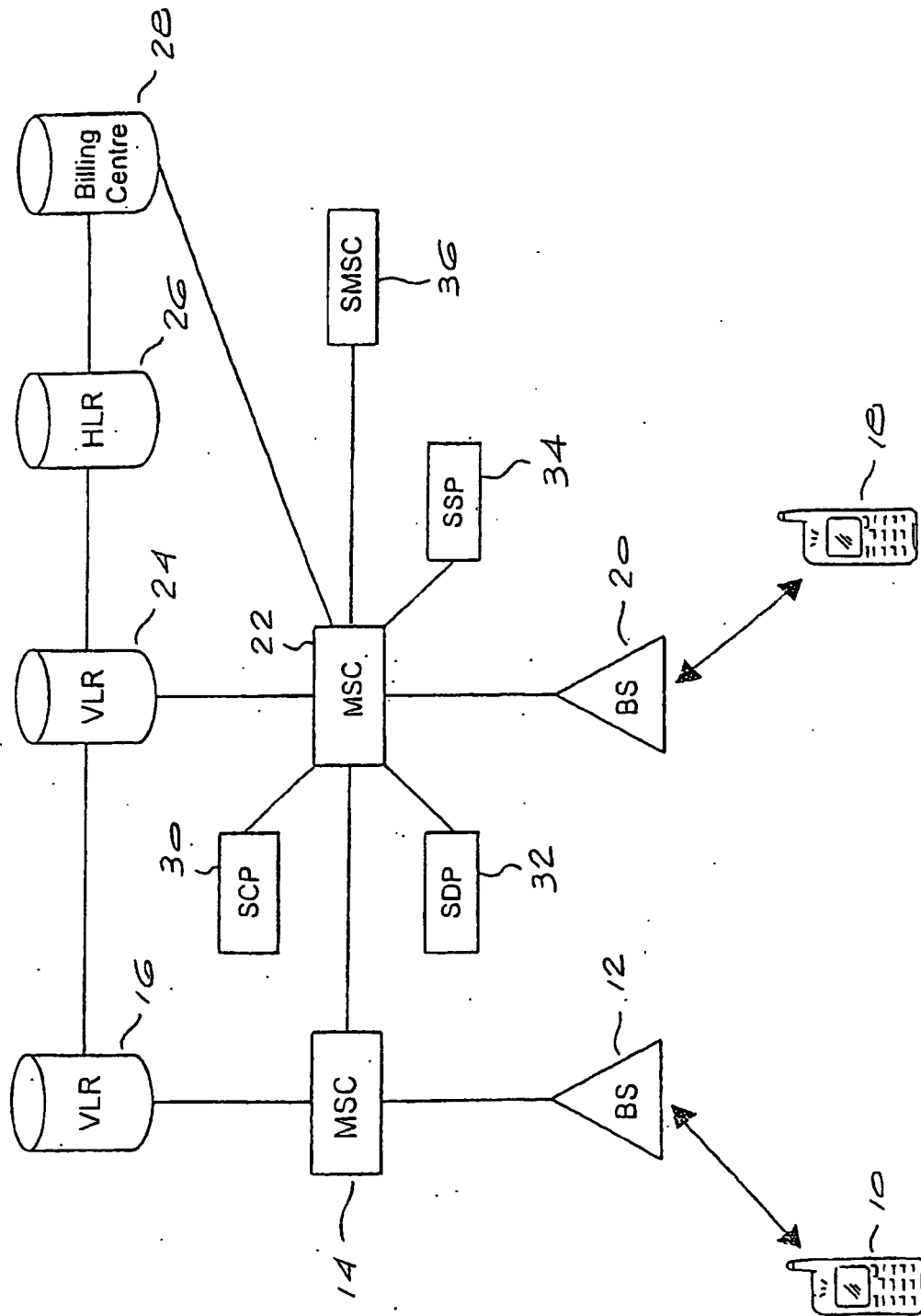
un réseau avec une pluralité d'utilisateurs ; et un noeud de réseau (14) possédant une logique de filtrage d'appels, **caractérisé en ce que** le noeud de réseau est configuré pour :

- i) surveiller les tentatives d'appel faites par des utilisateurs n'ayant pas suffisamment de crédit ou de temps d'antenne pour appeler un destinataire souhaité (18) ; et
- ii) transmettre une demande d'appel au destinataire de l'appel souhaité,

le noeud de réseau étant exploitable pour transmettre la demande d'appel à un combiné téléphonique (18) du destinataire souhaité de manière à ce que le combiné téléphonique du destinataire avertisse le destinataire d'une telle ten-

tative d'appel sans établir d'appel classique.

14. Un système selon la revendication 13, **caractérisé en ce qu'il** inclut une base de données (28) contenant des renseignements sur la situation crédit/temps d'antenne d'abonnés du réseau, le noeud de réseau (14) étant configuré pour déterminer automatiquement la situation crédit/temps d'antenne d'un appelant et pour générer la demande d'appel si le crédit/temps d'antenne dont dispose l'appelant est insuffisant pour appeler.



REFERENCES CITED IN THE DESCRIPTION

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